BUREAU OF WATER

South Carolina Department of Health and Environmental Control

South Carolina Water Use Report

2003 Summary

September 2004

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South Carolina Water Use Report
2003 Summary

South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Bureau of Water
Groundwater Management Section

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Forward

The South Carolina Department of Health and Environmental Control (DHEC) is committed to the responsible management of South Carolina's water resources by encouraging continued conservation and reasonable use to ensure a sustainable supply for present and future demands. The South Carolina Surface Water Withdrawal and Reporting Act, 49-4-10 et. seq., and the South Carolina Groundwater Use and Reporting Act, 49-5-10 et. seq., require water users that withdraw three (3) million gallons or greater in any month to register with and report that use annually to DHEC.

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Introduction

South Carolinians have always enjoyed a water resource that is clean, abundant and easily attainable. Currently, close to 1.2 million people rely on groundwater and 2.8 million people rely on surface water for their drinking water and other uses in South Carolina. The U.S. Census Bureau estimates that South Carolina's population will increase by 600,000 people by the year 2025. Land development in response to increasing urbanization of the population converts more than 100,000 acres per year to urban use. This growth and development has placed increasing demand on the environment, natural resources and our water supplies.

Combined with ever changing natural conditions, continuing impacts to surface water bodies and groundwater systems through human induced contamination (physical and chemical) or natural impact demonstrate the vulnerability of this finite resource and the continuing need to closely monitor, manage and preserve the resource in South Carolina for current and future generations. The state General Assembly declared that the groundwater resources of the State be put to beneficial use to the fullest extent to which they are capable and to provide and maintain conditions which are conducive to the development and use of (all) water resources.

Consistent and accurate data collection is requisite in establishing water use trends and implementing reasonable management strategies. Water use reporting outside of designated Capacity Use Areas has been historically voluntary. As of January 1, 2001, anyone in the state withdrawing groundwater or surface water in excess of three (3) million gallons per month (in any month) must register and report that use annually to the South Carolina Department of Health and Environmental Control (Department). Registration and reporting is now an enforceable requirement of law.

Purpose and Methodology

The purpose of the *South Carolina Water Use Report* is to summarily present reported water use in South Carolina by county and use category during calendar year 2003. Annual reporting of water use by permitted and registered users provides the base data for this report. Water use is reported in **million gallons** per month. The Department maintains the water use databases utilized in this report.

Terminology

Aquifer – A geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Aquaculture water use (water use category) – Water used for raising, farming and/or harvesting of organisms that live in water, such as fish, shrimp and other shellfish and vegetal matter (seaweed).

Consumptive water use – The amount of water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment.

Effluent (wastewater) – Water conveyed out of a wastewater treatment facility or other works used for the purpose of treating, stabilizing, or holding wastewater.

Evapotranspiration – Collective term, including water discharged to the atmosphere as a result of evaporation from the soil and surface-water bodies and plant transpiration.

Farm – Any operation from which $1000.00 or more of agricultural products were sold or normally would be sold during the year.

Golf course irrigation (water use category) – Water applied to maintain golf course turf, including tee boxes, fairways, putting greens, associated practice areas and periphery aesthetic landscaping.

Groundwater – Generally, all subsurface water as distinct from surface water; specifically, that part of the subsurface water in the saturated zone.

Hydroelectric water use (water use category) – Water used in generating electricity where turbine generators are driven by falling water.

Industrial water use (water use category) – Water used for commercial and industrial purposes, including fabrication, processing, washing, in-plant conveyance and cooling.

Irrigated acreage – Acreage capable of being irrigated, with regard to availability of water, suitable soils and topography of land.

Irrigation water use (water use category) – Water that is used for agricultural and landscaping purposes including turf farming and livestock management.

Other use (water use category) – Any use of surface water or groundwater not specifically identified in any of the other categories.

Reclaimed water – Wastewater treatment plant effluent that has been diverted, intercepted, or otherwise conveyed for use before it reaches a natural waterway or aquifer.

Surface water – Water flowing or stored on the earth's surface such as a stream, lake, or

reservoir.

Thermoelectric water use (water use category) – Water used in generating electricity from fossil fuel (coal, oil, natural gas), geothermal, biomass, solid waste, or nuclear energy.

Water supply (water use category) – Water withdrawn by public and private water suppliers and conveyed to users or groups of users. Water suppliers provide water for a variety of uses including domestic, commercial, industrial and public water use.

Water usage rates – As utilized in this report, measurements to quantitatively represent withdrawal over time; as in gallons per minute (gpm), gallons per day (gpd) and gallons per year (gpy).

Water use – Generally, water that is used for a specific purpose (i.e., domestic use, industrial, etc.). Broadly, human interaction with and influence on the hydrologic cycle, and includes water withdrawal, distribution, consumptive use, wastewater collection and return flow.

Withdrawal – The removal of surface water or groundwater from the natural hydrological system for use, including, but not limited to, water supply, industrial use, commercial use, domestic use, irrigation, livestock, power generation.

South Carolina Climate

The climate of South Carolina has four recognizable and distinct seasons, *winter, spring, summer* and *fall*. Annual average temperature varies from the mid-50's in the up-state region to low-60's along the coastal region. The Appalachian/Blue Ridge Mountains block many cold air masses circulating from the northwest allowing mild winters. Summers are typically hot and humid, characterized by evening thunderstorms. Precipitation is fairly evenly distributed throughout the year, however, winter and later summer generally have the greater rainfall. The historical average annual precipitation is approximately 48 inches, with an annual total in the mountains of 70 to 80 inches, an annual total in the Midlands of 42 to 47 inches and an annual total along the coast of 50 to 52 inches. Measurable snowfall is rare, occurring one to three times a year with accumulations seldom remaining more than a day or two. Since 1900 severe droughts have occurred statewide in 1925, 1933, 1954, 1977, 1983, 1986, 1990, 1993 and 2001. The most severe drought occurred in 2001. Figure 1 through Figure 5 presents precipitation data for the years 1995 through 2003.

(Climate data interpreted from the South Carolina Department of Natural Resources, State Climatologist)

South Carolina Annual Precipitation Data

Annual 1995 - 2003 Average = 48.39 Inches
Annual 1995 - 2003 Trend = -8.29 Inches / Decade

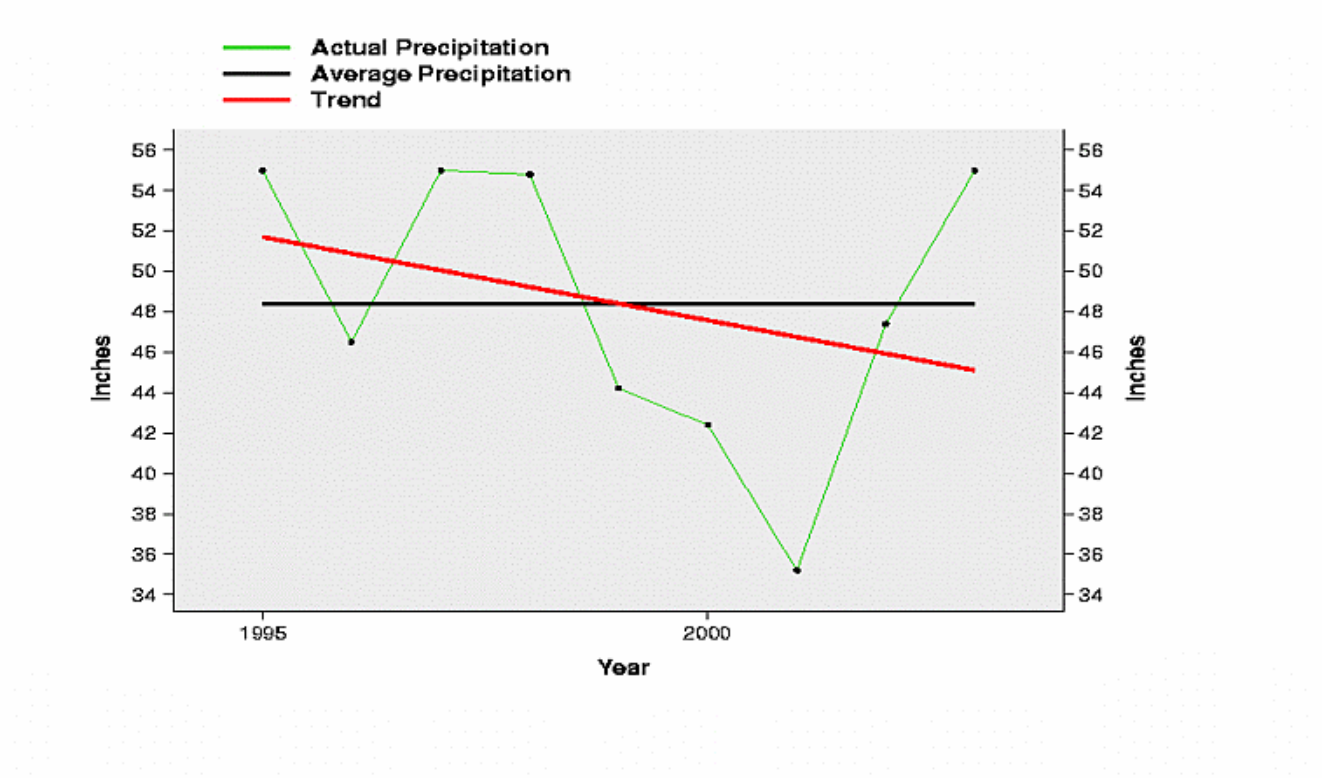

Figure 1 (National Oceanic and Atmospheric Administration, South Carolina Climate Summary)

South Carolina Winter Precipitation Data

Winter (Dec-Feb) 1995 - 2004 Average = 11.32 Inches
Winter (Dec-Feb) 1995 - 2004 Trend = -6.98 Inches / Decade

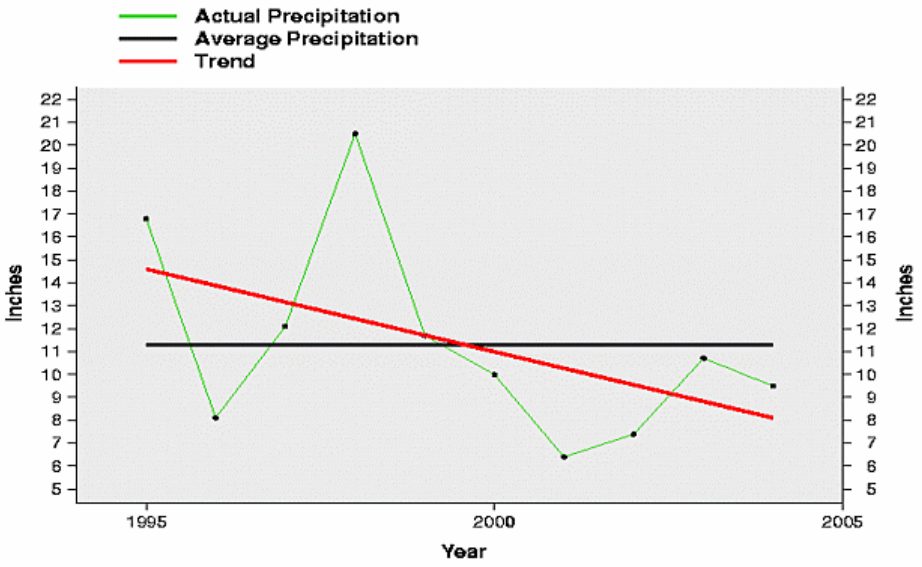

Figure 2 (National Oceanic and Atmospheric Administration, South Carolina Climate Summary)

South Carolina Spring Precipitation Data

Spring (Mar-May) 1995 - 2004 Average = 10.59 Inches
Spring (Mar-May) 1995 - 2004 Trend = 1.49 Inches / Decade

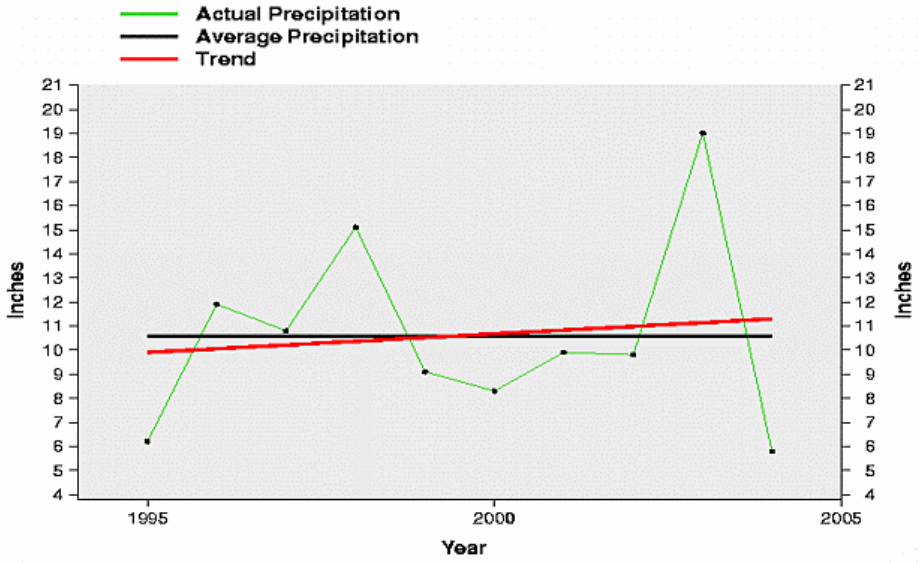

Figure 3 (National Oceanic and Atmospheric Administration, South Carolina Climate Summary)

South Carolina Summer Precipitation Data

Summer (Jun-Aug) 1995 - 2003 Average = 14.79 Inches
Summer (Jun-Aug) 1995 - 2003 Trend = -3.14 Inches / Decade

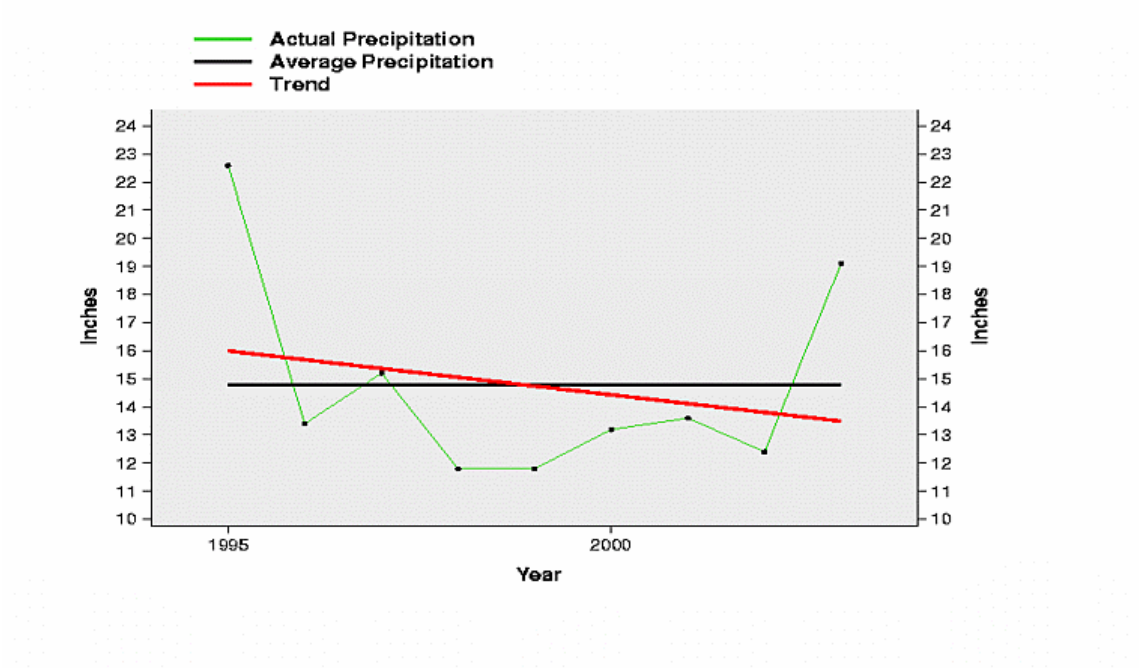

Figure 4 (National Oceanic and Atmospheric Administration, South Carolina Climate Summary)

South Carolina Fall Precipitation Data

Fall (Sep-Nov) 1995 - 2003 Average = 11.31 Inches
Fall (Sep-Nov) 1995 - 2003 Trend = -4.58 Inches / Decade

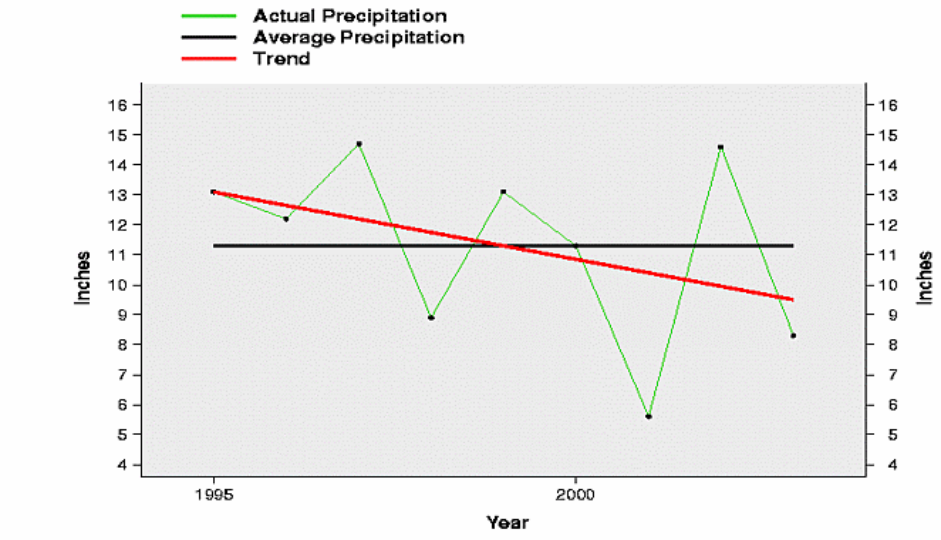

Figure 5 (National Oceanic and Atmospheric Administration, South Carolina Climate Summary)

South Carolina Geography and Hydrogeology

South Carolina has a distinct natural beauty and an ecological diversity covering nearly 31,189 square miles, with approximately 30,111 square miles land area and approximately 1,078 square miles inland or coastal waterways. The diversity we experience is resultant of climatic conditions, geology and three major physiographic regions: the Blue Ridge, the Piedmont and the Coastal Plain (Figure 6). The physiographic regions exhibit variations in topography, geology, hydrology and vegetation that directly affect the quantity, quality and availability of water resources in South Carolina. The geology of South Carolina is characterized in general as crystalline rocks of the Blue Ridge and Piedmont physiographic regions and unconsolidated sediments of the Coastal Plain.

Blue Ridge

The Blue Ridge physiographic province is located in the extreme northwest portion of Oconee and Pickens counties (Figure 6). Geology of the Blue Ridge is typically characterized by clayey saprolite, ranging in depth from several feet to tens of feet, overlying crystalline rock. The saprolite grades downward through a highly permeable transition zone to unaltered parent bedrock. Groundwater conditions of the bedrock are dependent on the number of fractures and degree of interconnection of the fracture systems. Groundwater moves slowly through the saprolite and discharges to surface water bodies, wells, or is released from storage to the underlying bedrock through fractures.

Piedmont

The Piedmont physiographic province includes all counties, or portions of counties, northwest of and to the Fall Line (Figure 6). Geology of the Piedmont is developed similarly to that of the Blue Ridge, but the diminished relief allows for greater thickness of saprolite development.

Coastal Plain

The Coastal Plain physiographic province includes all counties, or portions of counties, extending from the *Fall Line* east of and to the Atlantic Ocean (Figure 6). Geology of the Coastal Plain is characterized by aquifers developed in layers of sands and silts or high-permeability limestone confined by units of clay and silts or low-permeability limestone. The hydraulic characteristics of the Coastal Plain aquifers are determined by composition, thickness, areal extent and relative distance from the outcrop or recharge area. A generalized cross-section for the Coastal Plain aquifers is presented as Figure 7.

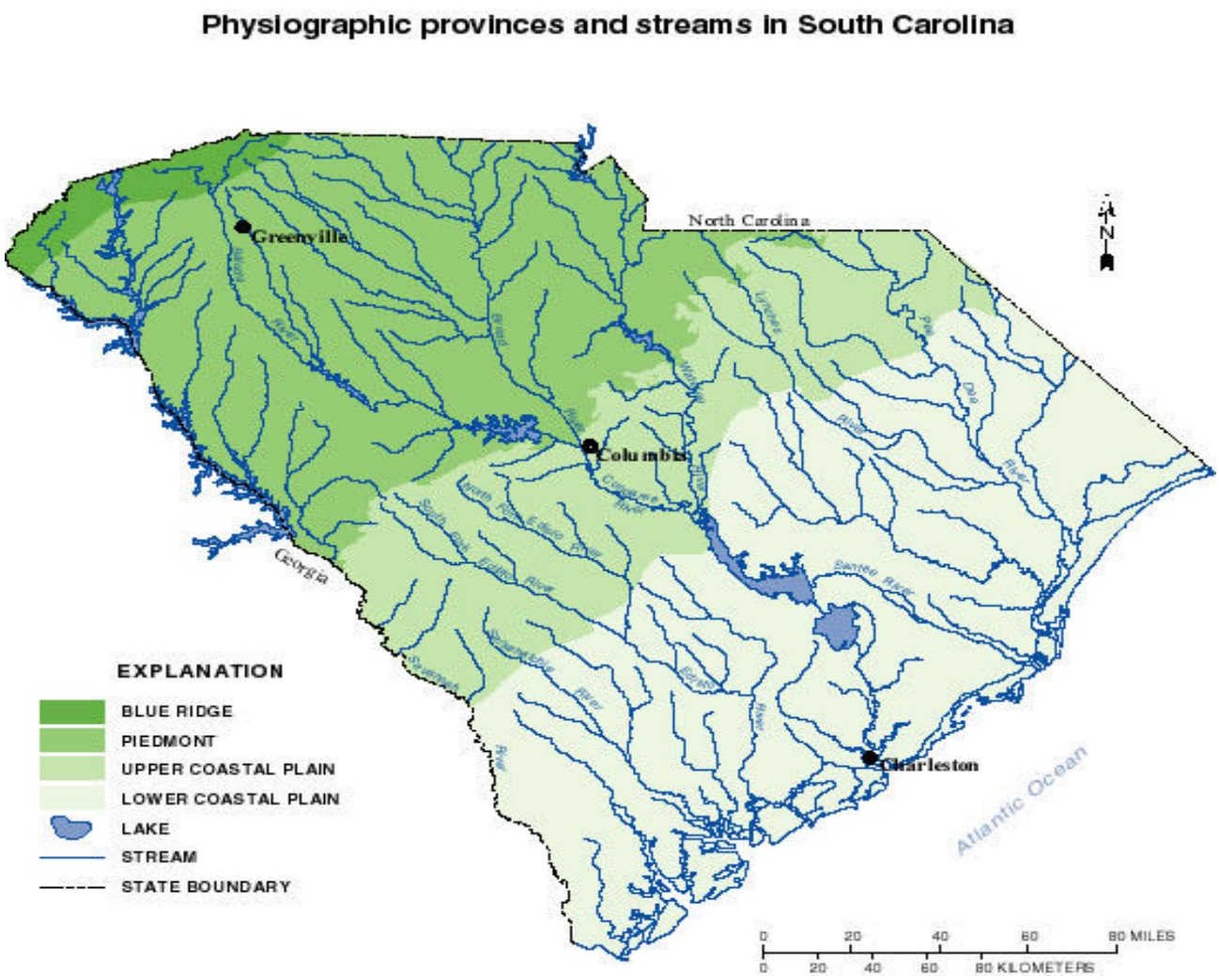

Figure 6

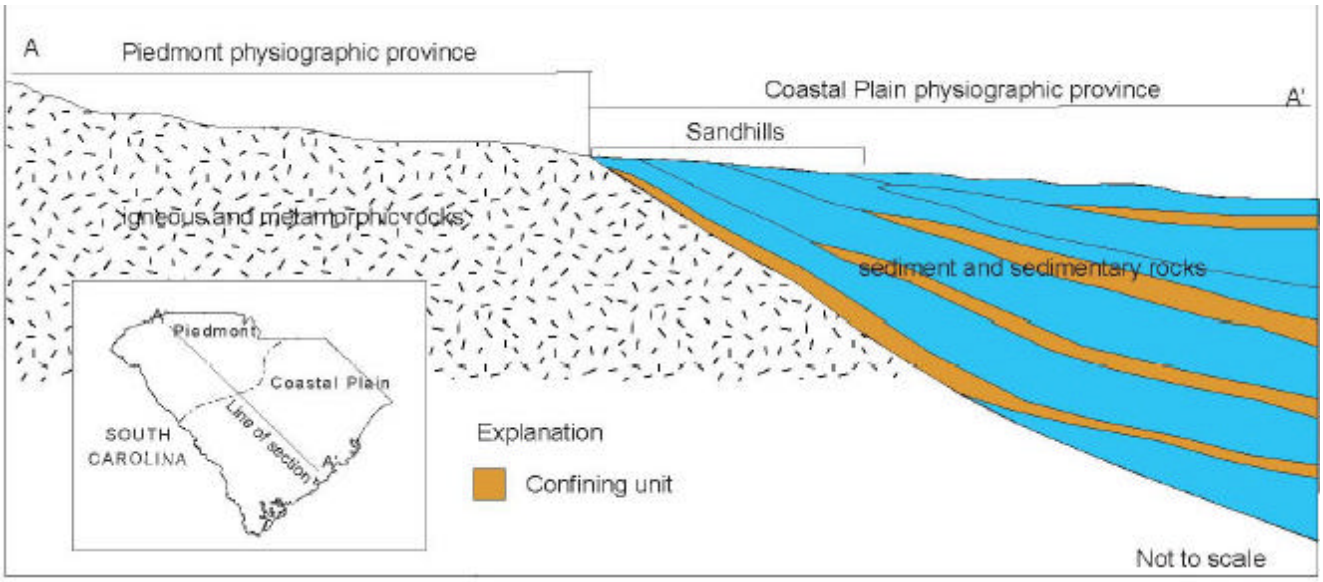

Figure 7 Generalized Cross-Section

Demographics

According to the 2000 Census, South Carolina's counted population is 4,012,012 people. Currently, almost 55% of South Carolinians live in an urban setting and approximately 45% live in rural communities. South Carolina has 24,541 farms (decline of 1,266 from 1997), occupying 4,845,923 acres (decline of 19,115 ac. from 1997). Of this, approximately 2,270,084 acres (decline of 333,831 ac. from 1997) are cropland [(1)]. Manufacturing interests represent the largest private employer in South Carolina and major manufacturing/industrial complexes are located along the I-26/I-85 and I-20/I-95 corridors, specifically in the Greenville-Spartanburg Metropolitan Statistical Area (MSA), Columbia MSA, Charlotte-Gastonia-Rock Hill MSA and the Florence/Pee Dee region. Other manufacturing concentrations are located in the Augusta-Aiken MSA and Charleston MSA[(2)]. At present, South Carolina is served by 47 electric utilities and nine (9) generating utility companies with 51 power plants (206 generators) with a total rating capacity of 18,827.4 megawatts. Power production in the State (2000) totaled 90,079 million kilowatt hours [(3)].

(Source: (1) 2002 Census of Agriculture, Volume 1 Geographic Area Series, "Table 8. Land: 2002 and 1997."
(2) S.C. Department of Commerce, 2004, "South Carolina Regional Profiles."
(3) S.C. Energy Office "2001 South Carolina Energy Use Profile.")

Total Reported Water Use

Reported water use from 833 facilities for 2003 approached 23 trillion gallons (22,911,098,089,000), an approximate increase of 60% over 2002 water use. The largest increase of water use (7.5 trillion gallons) was associated with a nearly 100 % increase in electricity generation by hydroelectric facilities during 2003 in the state [(1)]. Surface water withdrawal from 470 facilities accounted for approximately 22.8 trillion gallons (22,843,528,939,000), approximately 99.71%. Groundwater withdrawal from 527 reporting facilities accounted for approximately 67.6 billion gallons (67,569,150,000) or approximately 0.29%.

Total Reported Water Use
By Source (in million gallons)

Surface Water	Groundwater	Total
22,843,528.939	67,569.150	22,911,098.089

Total Reported Water Use
By Category (in million gallons)

Water Use	Surface Water	Groundwater	Total
Hydroelectric	18,958,206.838	0.935	18,958,207.773
Thermoelectric	3,556,371.245	2,103.630	3,558,474.875
Water Supply	157,026.905	40,061.364	197,088.269
Industrial	157,215.506	11,119.253	168,334.759
Irrigation	5,222.858	6,949.998	12,172.856
Golf Course	7,706.305	2,667.168	10,373.473
Mining	467.190	4,467.880	4,935.070
Aquaculture	1,312.092	139.889	1,451.981
Other	0.000	59.033	59.033
Total	22,843,528.939	67,569.150	22,911,098.089

Total Reported Water Use
Comparison by Year
(in million gallons)

Water Use	1999	2000	2001	2002	2003
Hydroelectric	**12,160,642.620**	**10,281,681.910**	**9,796,267.910**	**11,415,081.440**	**18,958,207.773**
Thermoelectric.	**2,326,627.770**	**2,240,508.370**	**1,624,984.880**	**2,467,042.320**	**3,558,474.875**
Water Supply	**221,911.790**	**148,265.210**	**193,525.290**	**212,402.790**	**197,088.269**
Industrial	**172,314.140**	**157,463.330**	**180,579.900**	**167,051.340**	**168,334.759**
Irrigation	**9,470.970**	**3,182.730**	**27,121.140**	**29,668.390**	**12,172.856**
Golf Course	**6,323.770**	**6,806.350**	**13,302.540**	**14,022.920**	**10,373.473**
Mining	**2,546.920**	**3,056.080**	**2,691.750**	**3,159.880**	**4,935.070**
Aquaculture	**35.970**	**13.670**	**865.170**	**2,283.950**	**1,451.981**
Other	**367.060**	**223.610**	**204.840**	**106.220**	**59.033**
Total	**14,900,241.010**	**12,841,201.260**	**11,839,543.420**	**14,310,819.250**	**22,911,098.089**
Facilities	**717**	**577**	**931**	**848**	**833**

(1) Energy Information Administration, 2003 Power Plant Report, Electricity Market in South Carolina

Water Use in Power Production

According to the S.C. Energy Office, 2001 Energy Use Profile, South Carolina has 9 power generating utility companies with 51 power plants containing 206 generators with a total rating capacity of 18,827.4 megawatts (2000). The type generators are as follows:

96- Hydraulic Turbine (conventional)
54- Gas Combustion Turbine
37- Steam Turbine (boiler)
16- Hydraulic Turbine (pump storage)
3- Internal Combustion (diesel)

The primary energy source for the generators is as follows:

112- Water
32- Diesel Fuel Oil
28- Coal
25- Natural Gas
7- Nuclear
2- Residual Fuel Oil

Hydroelectric Water Use

Hydroelectric facilities convert energy from flowing water to produce electricity. Hydroelectric facilities utilize *impoundments* (reservoirs), *diversion* (run-of river) *or pumped storage* (reversible turbines). Water use is typically non-consumptive flow-through, with temporary diversion from down stream users. Reported water use for 32 hydroelectric sources accounted for approximately 19 trillion gallons (18,958,207,773,000), approximately 84.20% of reported water use for power production and 82.75% of total reported water use for the year.

Hydroelectric
(in million gallons)

County	Surface Water	Groundwater	Total
Abbeville	42,804.000	0.000	42,804.000
Anderson	276.600	0.000	276.600
Berkeley	1,207,806.198	0.935	1,207,807.133
Cherokee	502,053.000	0.000	502,053.000
Chester	3,059,476.000	0.000	3,059,476.000
Edgefield	1,198,558.600	0.000	1,198,558.600
Fairfield	3,165,364.830	0.000	3,165,364.830
Greenville	0.012	0.000	0.012
Greenwood	420,151.000	0.000	420,151.000
Kershaw	2,047,284.000	0.000	2,047,284.000
Lancaster	1,381,492.000	0.000	1,381,492.000
Laurens	134.500	0.000	134.500
Lexington	685,270.710	0.000	685,270.710
Oconee	7.150	0.000	7.150
Pickens	2,728,023.580	0.000	2,728,023.580
Richland	509,703.050	0.000	509,703.050
Spartanburg	4,076.918	0.000	4,076.918
Union	597,570.690	0.000	597,570.690
York	1,408,154.000	0.000	1,408,154.000
Total	18,958,206.838	0.935	18,958,207.773

Thermoelectric Water Use

Thermoelectric facilities generate electricity by superheating water to steam then passing the steam under pressure to turbines. Boilers are fired by coal, nuclear power or residual fuel oil. Large volumes of cooling water are required to condense the steam to the liquid state. Reported water use for 18 thermoelectric sources accounted for more than 3.5 trillion gallons (3,558,474,875,000), approximately 15.80% of reported water use for power production and 15.53% of total reported water use for the year.

Thermoelectric
(in million gallons)

County	Surface Water	Groundwater	Total
Aiken	53,110.000	0.000	53,110.000
Anderson	52,766.892	0.000	52,766.892
Berkeley	166,266.381	8.506	166,274.887
Cherokee	0.000	0.000	0.000
Colleton	1,309.050	2.203	1,311.253
Darlington	296,537.000	432.837	296,969.837
Fairfield	246,543.778	0.000	246,543.778
Georgetown	3,863.504	0.000	3,863.504
Greenwood	115.200	0.000	115.200
Horry	39,724.810	0.000	39,724.810
Lexington	48,610.130	0.000	48,610.130
Oconee	2,467,115.000	0.000	2,467,115.000
Orangeburg	0.000	1,660.084	1,660.084
Richland	144,809.500	0.000	144,809.500
York	35,600.000	0.000	35,600.000
Total	3,556,371.245	2,103.630	3,558,474.875

Total Reported Water Use
(excluding power production)

During 2003, reported water use (excluding power production) totaled more than 394 billion gallons (394,415,441,000), with surface water withdrawal accounting for 328,950,865,000 gallons or approximately 83.40% and groundwater withdrawal accounting for 65,464,585,000 gallons or approximately 16.60%.

Total Reported Water Use By Category
(excluding Power Production)
(in million gallons)

Water Use	Surface Water	Groundwater	Total
Water Supply	157,026.905	40,061.364	197,088.269
Industrial	157,215.506	11,119.253	168,334.759
Irrigation	5,222.858	6,949.998	12,172.856
Golf Course	7,706.305	2,667.168	10,373.473
Mining	467.190	4,467.880	4,935.070
Aquaculture	1,312.092	139.889	1,451.981
Other	0.000	59.033	59.033
Total	328,950.856	65,464.585	394,415.441

Total Water Use Reported

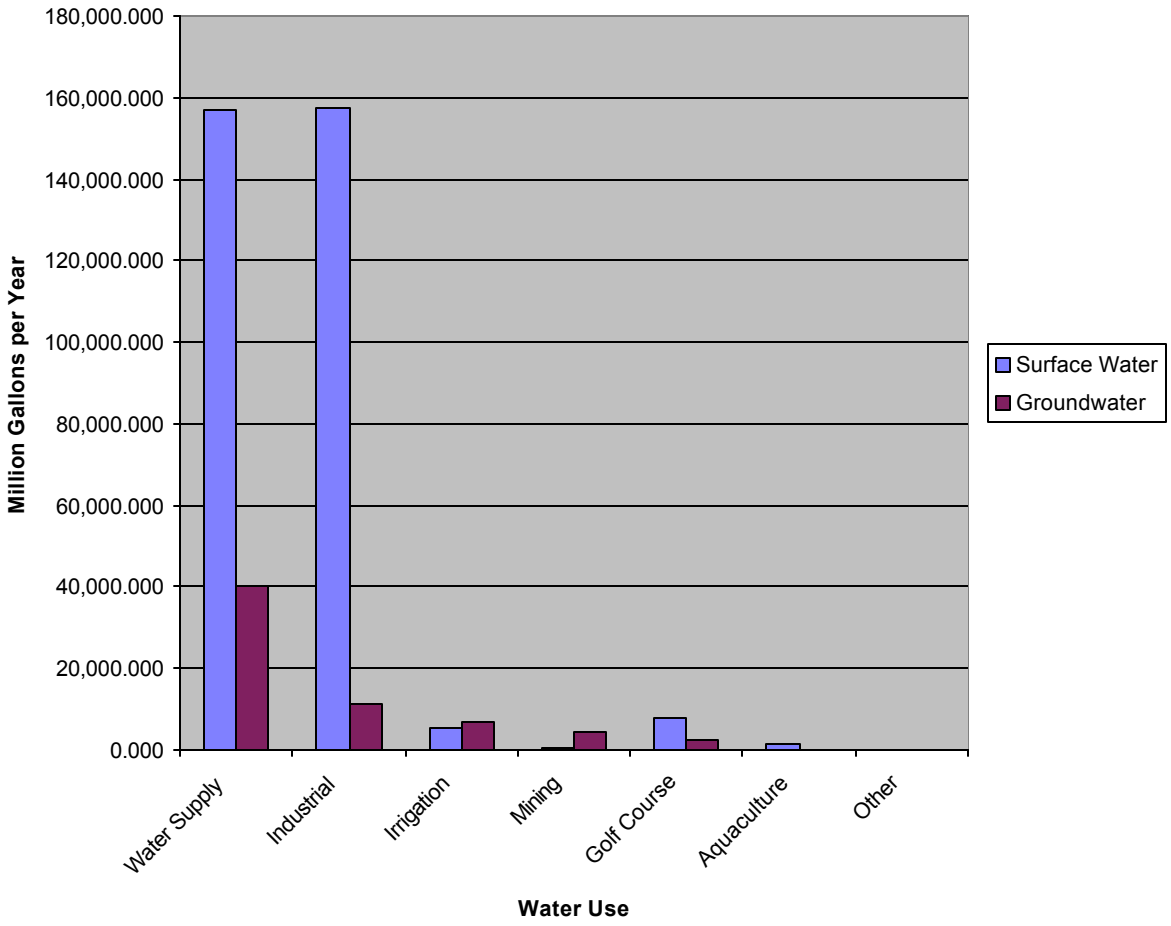

Chart 1

Water Supply

South Carolina has 1,551 defined public water systems, of which 685 are community water systems. The public water systems provide water to 3,450,928 citizens. Water withdrawal for public water supply from 220 reporting suppliers totaled 197,088,269,000 gallons, with 54 surface water systems accounting for 157,026,905,000 gallons and 176 groundwater systems accounting for 40,061,364,000 gallons.

Water Supply
By County
(in million gallons)

County	Groundwater	Surface Water	Total	Population Served
Abbeville	2.919	939.017	941.936	15,507
Aiken	4,564.925	1,733.388	6,298.313	128,257
Allendale	415.420	0.000	415.420	11,746
Anderson	0.000	7,349.308	7,349.308	175,341
Bamberg	527.601	0.000	527.601	10,617
Barnwell	686.014	0.000	686.014	14,172
Beaufort	4,352.805	5,679.473	10,032.278	131,863
Berkeley	236.862	4,676.897	4,913.759	61,597
Calhoun	236.645	0.000	236.645	6,510
Cherokee	0.000	2,718.400	2,718.400	423,953
Charleston	3,639.136	18,665.440	22,304.576	45,640
Chester	0.000	1,119.400	1,119.400	15,877
Chesterfield	474.466	1,048.792	1,523.258	30,693
Clarendon	627.690	0.000	627.690	16,459
Colleton	768.594	0.000	768.594	22,902
Darlington	2,267.157	0.000	2,267.157	54,935
Dillon	1,647.039	0.000	1,647.039	25,255
Dorchester	585.327	0.000	585.327	69,337
Edgefield	0.000	1,307.667	1,307.667	21,670
Fairfield	58.102	1,023.627	1,081.729	20,011
Florence	4,779.121	423.870	5,202.991	82,518
Georgetown	1,066.668	1,970.171	3,036.839	57,432
Greenville	28.682	23,620.000	23,648.682	368,165
Greenwood	19.230	4,772.800	4,792.030	50,077
Hampton	507.321	0.000	507.321	11,802
Horry	636.003	13,287.449	13,923.452	206,976
Jasper	563.386	0.000	563.386	12,072
Kershaw	772.193	1,680.373	2,452.566	56,821
Lancaster	0.000	6,741.166	6,741.166	67,235
Laurens	0.000	1,579.575	1,579.575	50,545
Lee	577.888	0.000	577.888	4,963
Lexington	373.169	4,843.625	5,216.794	111,445
Marion	1,388.508	0.000	1,388.508	27,222
Marlboro	877.293	373.100	1,250.393	21,574
McCormick	0.000	402.119	402.119	10,876
Newberry	47.365	2,079.127	2,126.492	24,709
Oconee	0.000	1,404.950	1,404.950	72,182
Orangeburg	585.140	2,915.626	3,500.766	63,475
Pickens	0.000	3,984.339	3,984.339	111,066
Richland	396.463	20,918.690	21,315.153	269,933
Saluda	105.535	0.000	105.535	7,379
Spartanburg	26.382	13,293.696	13,320.078	218,786
Sumter	5,858.533	0.000	5,858.533	84,193
Union	0.000	1,350.540	1,350.540	29,257
Williamsburg	356.982	0.000	356.982	15,711
York	4.800	5,124.280	5,129.080	112,172
Total	40,061.364	157,026.905	197,088.269	3,450,928

Water Supply Source Comparison

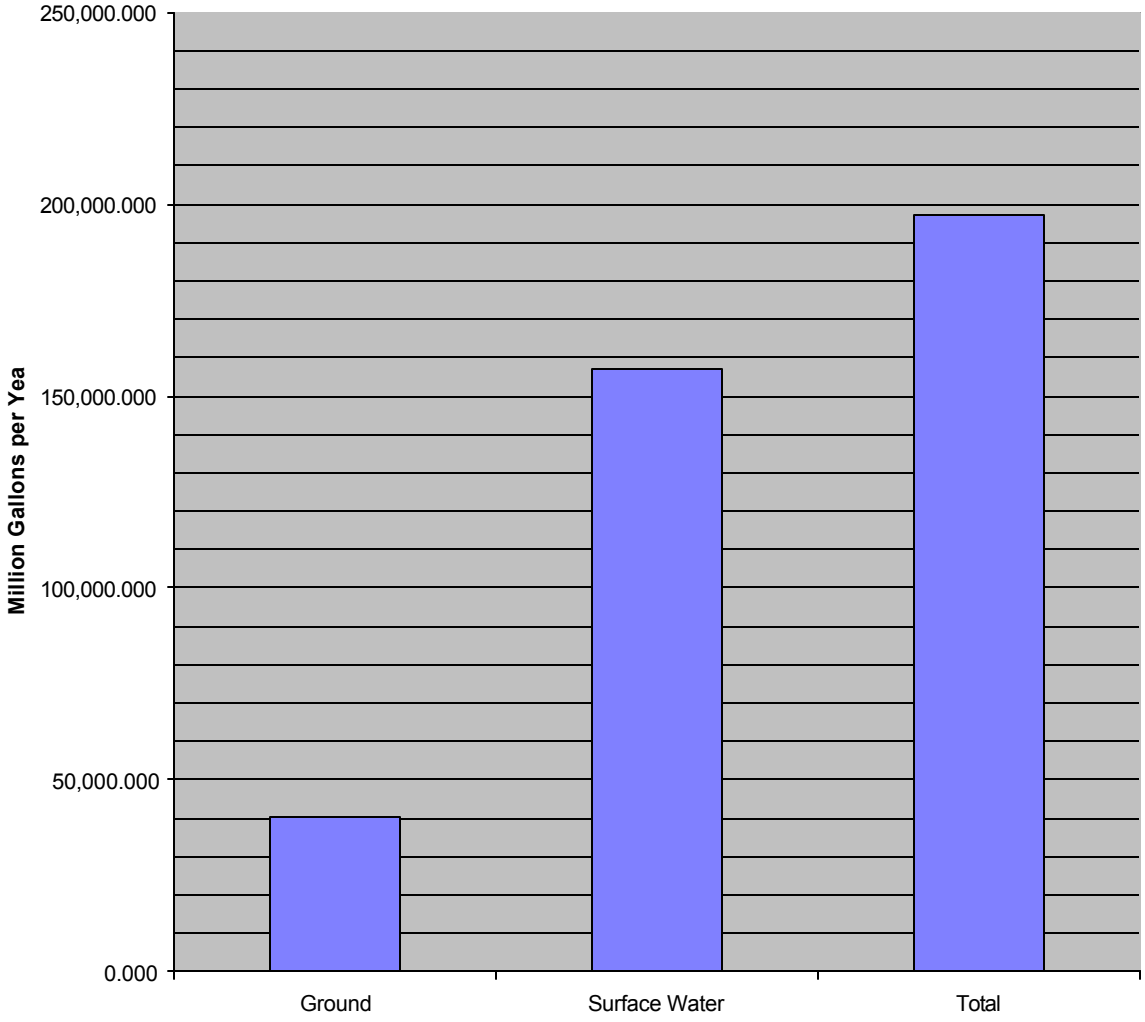

Chart 2

Industrial Use

Water withdrawal for industrial use from 94 reporting industries totaled 168,334,759,000 gallons, with 49 surface water systems accounting for 157,215,506,000 gallons and 61 groundwater systems accounting for 11,119,253,000 gallons. Water use at industrial facilities is predominantly cooling water (contact and non-contact) with return to surface water systems through permitted NPDES discharges.

Industrial Use
By County
(in million gallons)

County	Groundwater	Surface Water	Total
Aiken	1,663.958	21,471.315	23,135.273
Allendale	798.210	0.000	798.210
Anderson	0.000	40.930	40.930
Beaufort	145.595	0.000	145.595
Berkeley	1,087.236	3,497.636	4,584.872
Calhoun	167.500	33,100.632	33,268.132
Charleston	78.510	10,877.600	10,956.110
Cherokee	0.000	447.200	447.200
Chester	1.497	163.916	165.413
Darlington	1,314.583	8,042.000	9,356.583
Dorchester	802.100	183.820	985.920
Florence	656.176	7,781.801	8,437.977
Georgetown	25.942	12,095.406	12,121.348
Greenville	68.176	89.860	158.036
Greenwood	0.000	49.850	49.850
Hampton	376.400	0.000	376.400
Horry	87.834	47.800	135.634
Kershaw	345.542	965.660	1,311.202
Lancaster	0.000	1,134.400	1,134.400
Lexington	334.348	9,168.396	9,502.744
Marlboro	231.014	7,287.970	7,518.984
Oconee	0.000	736.723	736.723
Orangeburg	773.536	147.964	921.500
Pickens	0.000	3,251.463	3,251.463
Richland	647.863	10,316.156	10,964.019
Spartanburg	13.270	0.000	13.270
Sumter	418.332	0.000	418.332
Union	2.137	551.144	553.281
Williamsburg	1,075.700	0.000	1,075.700
York	3.794	25,765.864	25,769.658
Total	11,119.253	157,215.506	168,334.759

Industrial Water Source Comparison

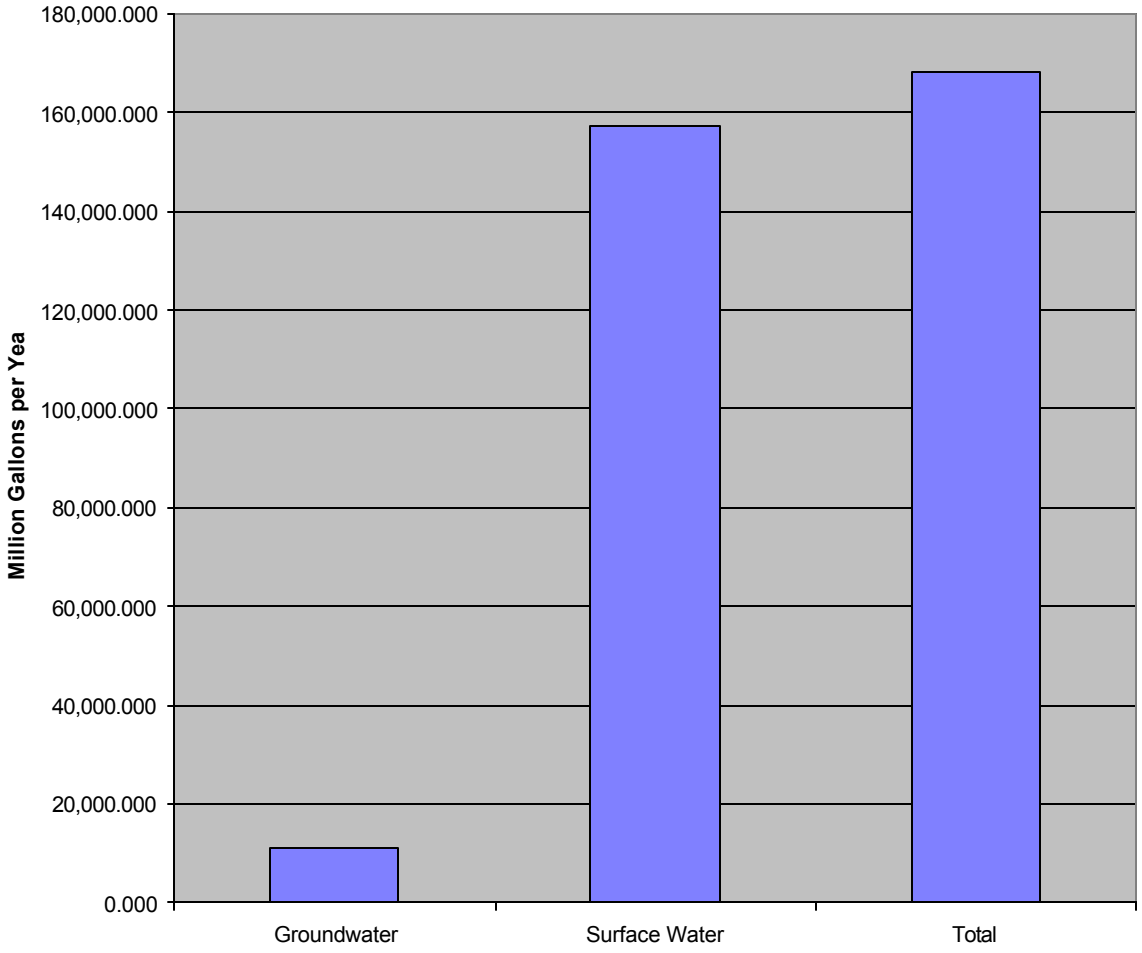

Chart 3

Irrigation Use

Total irrigated acreage in South Carolina increased from 88,898 acres in 1997 to 95,642 acres in 2002. Total irrigated harvested cropland was 91,795 acres in 2002[(1)]. Water withdrawal for irrigation use from 199 reporting entities totaled 12,172,856,000 gallons, with 98 surface water systems accounting for 5,222,858,000 gallons and 144 groundwater systems accounting for 6,949,998,000 gallons.

Irrigation Use
By County
(in million gallons)

County	Groundwater	Surface Water	Total	Total Irrigated Acreage
Aiken	112.559	5.140	117.699	1,799
Allendale	508.830	106.190	615.020	7,889
Bamberg	341.930	151.372	493.302	4,754
Barnwell	89.090	5.700	94.790	1,313
Beaufort	601.521	19.692	621.213	587
Berkeley	0.240	1,064.281	1,064.521	602
Calhoun	46.490	37.156	83.646	4,617
Charleston	5.466	26.904	32.370	1,666
Chesterfield	57.644	0.000	57.644	1,269
Clarendon	119.837	119.275	239.112	1,704
Colleton	1,264.900	414.000	1,678.900	1,287
Darlington	0.000	49.745	49.745	948
Dillon	3.000	0.000	3.000	1,928
Edgefield	23.000	375.500	398.500	5,304
Florence	53.120	13.825	66.945	2,505
Georgetown	0.000	940.561	940.561	1,325
Greenville	0.000	26.000	26.000	1,760
Greenwood	1.200	0.000	1.200	179
Hampton	856.215	11.000	867.215	2,674
Horry	105.946	216.628	322.574	741
Jasper	207.208	0.000	207.208	2,737
Lee	15.319	4.800	20.119	1,072
Lexington	891.404	289.179	1,180.583	7,262
Marion	4.150	0.000	4.150	575
Marlboro	125.810	40.720	166.530	2,136
Newberry	48.208	136.380	184.588	1,087
Oconee	0.000	37.800	37.800	545
Orangeburg	1,044.582	476.127	1,520.709	16,808
Pickens	0.000	10.100	10.100	847
Richland	0.982	0.200	1.182	516
Saluda	0.000	38.720	38.720	3,504
Spartanburg	0.000	103.600	103.600	1,908
Sumter	421.347	501.739	923.086	5,537
Williamsburg	0.000	0.500	0.500	758
York	0.000	0.024	0.024	757
Total	6,949.998	5,222.858	12,172.856	90,900

(1) U.S. Department of Agriculture, 2002 Census of Agriculture, Volume 1 Geographic Area Series, "Table 10. Irrigation: 2002 and 1997"

Irrigation Source Comparison

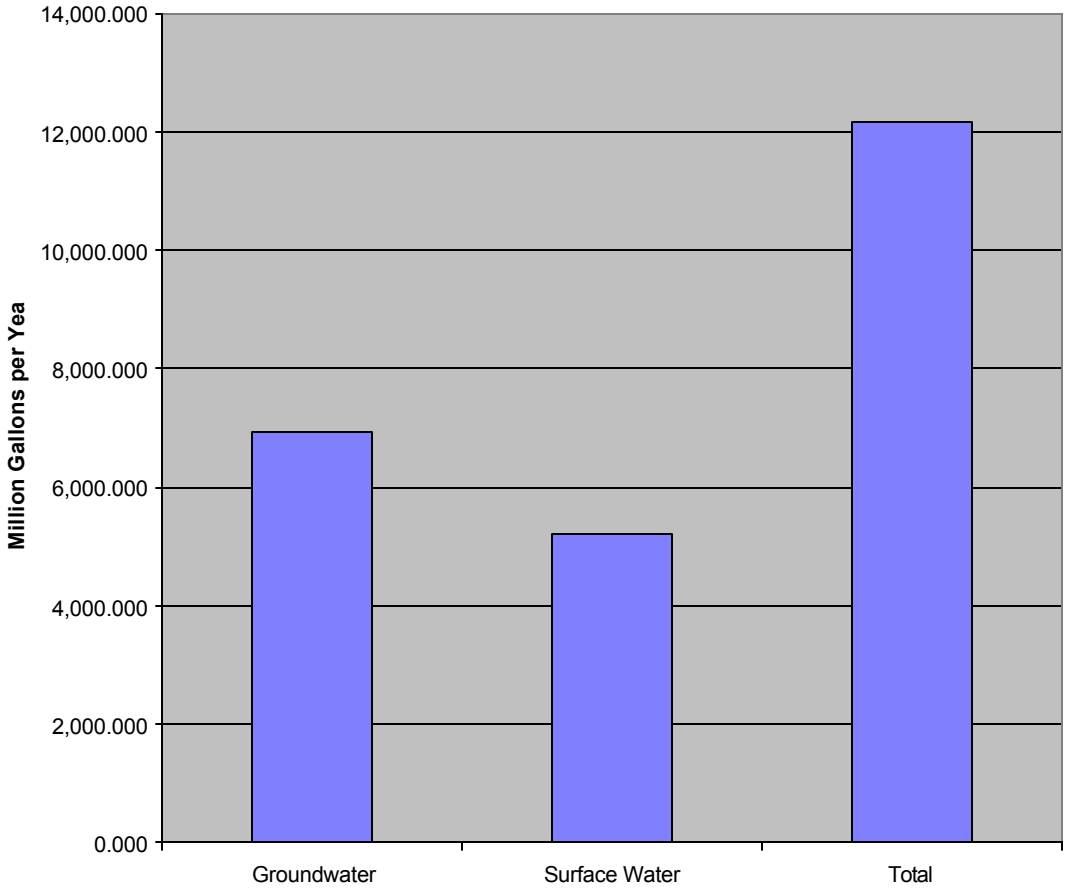

Chart 4

Golf Course Use

Water withdrawal from 247 reporting courses for golf course irrigation totaled 10,373,473,000 gallons, with 211 surface water systems accounting for 7,706,305,000 gallons and 121 groundwater systems accounting for 2,667,168,000 gallons.

Golf Course Irrigation
(in million gallons)

County	Groundwater	Surface Water	Total
Aiken	18.555	33.393	51.948
Anderson	0.000	71.809	71.809
Barnwell	0.000	69.600	69.600
Beaufort	825.898	1,816.964	2,642.862
Berkeley	9.000	16.112	25.112
Calhoun	21.800	37.700	59.500
Charleston	709.869	207.566	917.435
Chester	11.010	40.200	51.210
Chesterfield	0.000	81.346	81.346
Clarendon	14.450	41.880	56.330
Colleton	50.910	3.847	54.757
Darlington	0.000	89.013	89.013
Dorchester	65.000	0.000	65.000
Edgefield	22.050	5.750	27.800
Florence	126.300	34.575	160.875
Georgetown	10.100	928.696	938.796
Greenville	6.157	282.207	288.364
Greenwood	0.000	56.899	56.899
Hampton	14.080	0.000	14.080
Horry	432.954	2,349.007	2,781.961
Kershaw	29.624	33.917	63.541
Lancaster	1.218	2.900	4.118
Laurens	0.000	37.853	37.853
Lexington	15.110	190.000	205.110
Marion	36.638	8.300	44.938
McCormick	0.000	22.718	22.718
Newberry	0.000	7.000	7.000
Oconee	0.000	63.401	63.401
Orangeburg	11.339	90.453	101.792
Pickens	0.000	344.158	344.158
Richland	97.262	287.514	384.776
Spartanburg	0.785	97.513	98.298
Sumter	101.849	127.839	229.688
York	35.210	226.175	261.385
Total	2,667.168	7,706.305	10,373.473

Golf Course Source Comparison

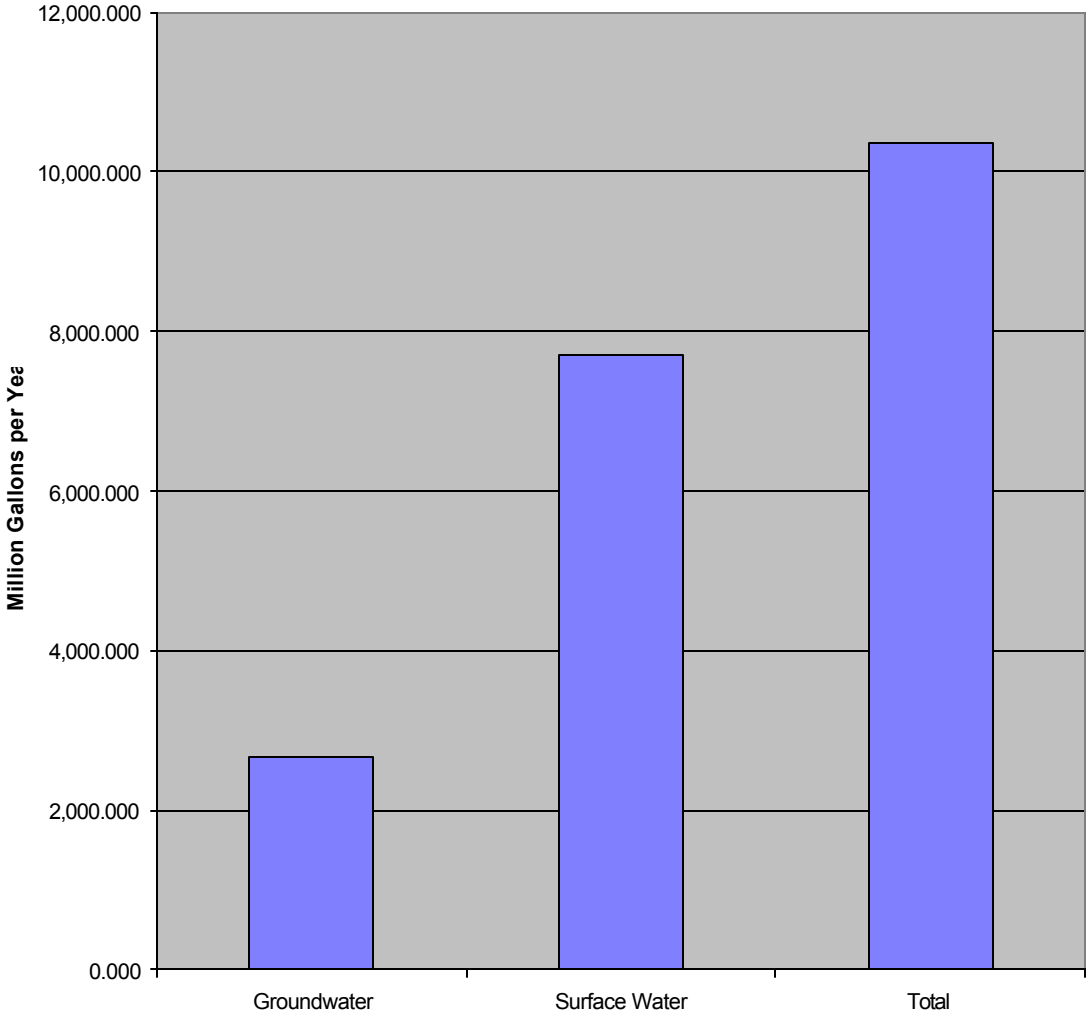

Chart 5

Mining Use

Water withdrawal associated with mining activities at 11 reporting facilities totaled 5,114,600,000 gallons, with 4 surface water systems accounting for 646,720,000 gallons and 9 groundwater systems accounting for 4,467,880,000 gallons.

Mining Activity
(in million gallons)

County	Groundwater	Surface Water	Total
Aiken	75.460	1.93	77.390
Berkeley	0.960	177.60	178.560
Colleton	0.000	1.93	1.930
Horry	0.000	177.60	177.600
Lexington	721.000	287.66	1,008.660
Orangeburg	1,761.340	0.000	1,761.340
Richland	1,716.060	0.000	1,716.060
York	193.060	0.000	193.060
Total	4,467.880	646.72	5,114.600

Mining Source Comparison

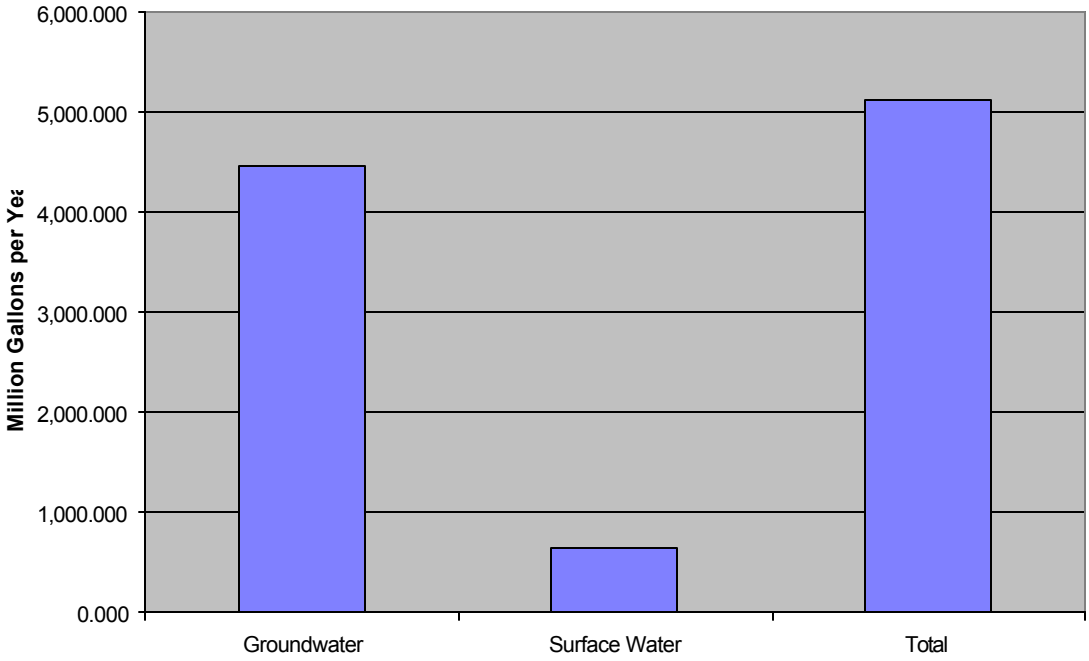

Chart 6

Aquaculture Use

Water withdrawal from 10 reporting aquaculture-farming facilities totaled 1,451,981,000 gallons, with 6 surface water systems accounting for 1,312,092,000 gallons and 7 groundwater systems accounting for 139,889,000 gallons.

Aquaculture
(in million gallons)

County	Groundwater	Surface Water	Total
Beaufort	7.472	83.861	91.333
Berkeley	2.817	37.911	40.728
Charleston	0.000	1,123.780	1,123.780
Dillon	26.800	0.000	26.800
Hampton	85.300	0.000	85.300
Jasper	4.000	0.000	4.000
Richland	13.500	31.500	45.000
Spartanburg	0.000	35.040	35.040
Total	139.889	1,312.092	1,451.981

Aquaculture Source Comparison

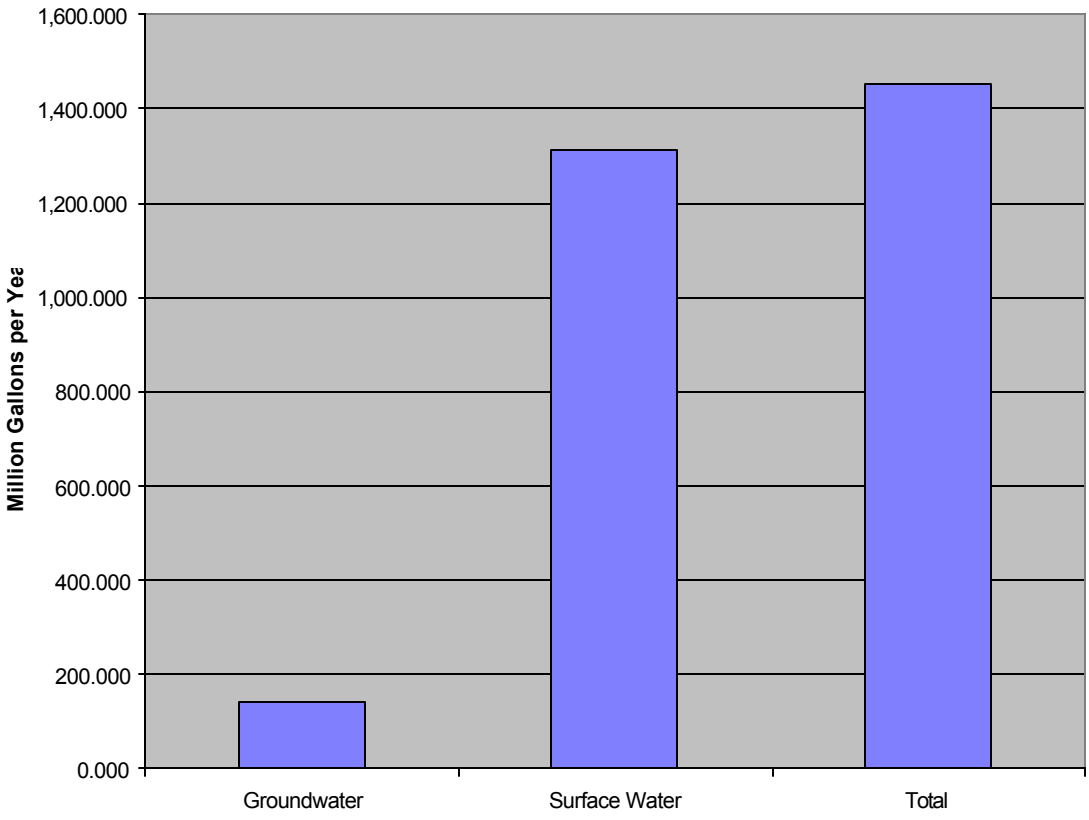

Chart 7

Other Use

Water withdrawal for other, non-specific use from 2 reporting facilities totaled 59,033,000 gallons, with groundwater accounting for all reported use.

Other Use (in million gallons)

County	Groundwater	Surface Water	Total
Beaufort	25.100	0.000	25.100
Horry	33.933	0.000	33.933
Total	59.033	0.000	59.033

Other Source Comparison

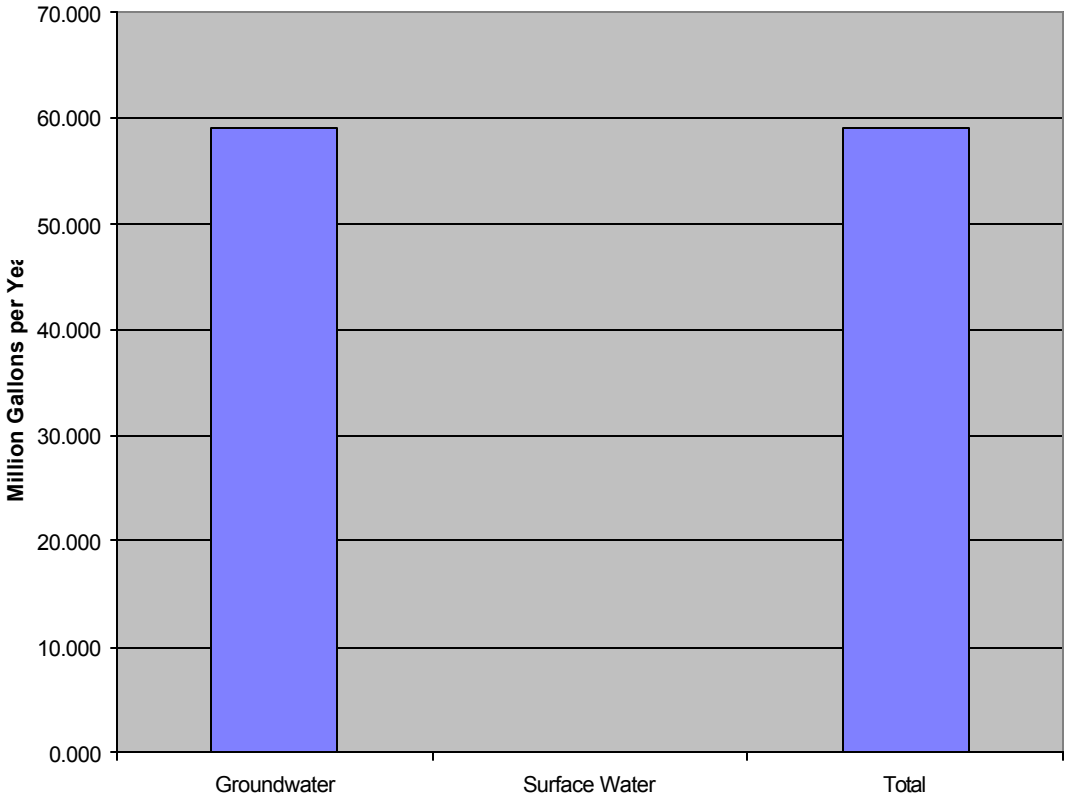

Chart 8

2003 Surface Water Use by County (in million gallons)

County	Hydroelectric	Thermoelectric	Water Supply	Industrial	Irrigation	Golf Course	Mining	Aquaculture	Other	Total
Abbeville	42,804.000	0.000	939.017	0.000	0.000	0.000	0.000	0.000	0.000	43,743.017
Aiken	0.000	53,110.000	1,733.388	21,471.315	5.140	33.393	0.000	0.000	0.000	76,353.236
Allendale	0.000	0.000	0.000	0.000	106.190	0.000	0.000	0.000	0.000	106.190
Anderson	276.600	52,766.892	7,349.308	40.930	0.000	71.809	0.000	0.000	0.000	60,505.539
Bamberg	0.000	0.000	0.000	0.000	151.372	0.000	0.000	0.000	0.000	151.372
Barnwell	0.000	0.000	0.000	0.000	5.700	69.600	0.000	0.000	0.000	75.300
Beaufort	0.000	0.000	5,679.473	0.000	19.692	1,816.964	0.000	83.861	0.000	7,599.990
Berkeley	1,207,806.198	166,266.381	4,676.897	3,497.636	1,064.281	16.112	0.000	37.911	0.000	1,383,365.416
Calhoun	0.000	0.000	0.000	33,100.632	37.156	37.700	0.000	0.000	0.000	33,175.488
Charleston	0.000	0.000	18,665.440	10,877.600	26.904	207.566	0.000	1,123.780	0.000	30,901.290
Cherokee	502,053.000	0.000	2,718.400	447.200	0.000	0.000	0.000	0.000	0.000	505,218.600
Chester	3,059,476.000	0.000	1,119.400	163.916	0.000	40.200	0.000	0.000	0.000	3,060,799.516
Chesterfield	0.000	0.000	1,048.792	0.000	0.000	81.346	0.000	0.000	0.000	1,130.138
Clarendon	0.000	0.000	0.000	0.000	119.275	41.880	0.000	0.000	0.000	161.155
Colleton	0.000	1,309.050	0.000	0.000	414.000	3.847	1.930	0.000	0.000	1,728.827
Darlington	0.000	296,537.000	0.000	8,042.000	49.745	89.013	0.000	0.000	0.000	304,717.758
Dillon	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Dorchester	0.000	0.000	0.000	183.820	0.000	0.000	0.000	0.000	0.000	183.820
Edgefield	1,198,558.600	0.000	1,307.667	0.000	375.500	5.750	0.000	0.000	0.000	1,200,247.517
Fairfield	3,165,364.830	246,543.778	1,023.627	0.000	0.000	0.000	0.000	0.000	0.000	3,412,932.235
Florence	0.000	0.000	423.870	7,781.801	13.825	34.575	0.000	0.000	0.000	8,254.071
Georgetown	0.000	3,863.504	1,970.171	12,095.406	940.561	928.696	0.000	0.000	0.000	19,798.338
Greenville	0.012	0.000	23,620.000	89.860	26.000	282.207	0.000	0.000	0.000	24,018.079
Greenwood	420,151.000	115.200	4,772.800	49.850	0.000	56.899	0.000	0.000	0.000	425,145.749
Hampton	0.000	0.000	0.000	0.000	11.000	0.000	0.000	0.000	0.000	11.000
Horry	0.000	39,724.810	13,287.449	47.800	216.628	2,349.007	177.600	0.000	0.000	55,803.294
Jasper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Kershaw	2,047,284.000	0.000	1,680.373	965.660	0.000	33.917	0.000	0.000	0.000	2,049,963.950
Lancaster	1,381,492.000	0.000	6,741.166	1,134.400	0.000	2.900	0.000	0.000	0.000	1,389,370.466
Laurens	134.500	0.000	1,579.575	0.000	0.000	37.853	0.000	0.000	0.000	1,751.928
Lee	0.000	0.000	0.000	0.000	4.800	0.000	0.000	0.000	0.000	4.800
Lexington	685,270.710	48,610.130	4,843.625	9,168.396	289.179	190.000	287.660	0.000	0.000	748,659.700
Marion	0.000	0.000	0.000	0.000	0.000	8.300	0.000	0.000	0.000	8.300
Marlboro	0.000	0.000	373.100	7,287.970	40.720	0.000	0.000	0.000	0.000	7,701.790
McCormick	0.000	0.000	402.119	0.000	0.000	22.718	0.000	0.000	0.000	424.837
Newberry	0.000	0.000	2,079.127	0.000	136.380	7.000	0.000	0.000	0.000	2,222.507
Oconee	7.150	2,467,115.000	1,404.950	736.723	37.800	63.401	0.000	0.000	0.000	2,469,365.024
Orangeburg	0.000	0.000	2,915.626	147.964	476.127	90.453	0.000	0.000	0.000	3,630.170
Pickens	2,728,023.580	0.000	3,984.339	3,251.463	10.100	344.158	0.000	0.000	0.000	2,735,613.640
Richland	509,703.050	144,809.500	20,918.690	10,316.156	0.200	287.514	0.000	31.500	0.000	686,066.610
Saluda	0.000	0.000	0.000	0.000	38.720	0.000	0.000	0.000	0.000	38.720
Spartanburg	4,076.918	0.000	13,293.696	0.000	103.600	97.513	0.000	35.040	0.000	17,606.767
Sumter	0.000	0.000	0.000	0.000	501.739	127.839	0.000	0.000	0.000	629.578
Union	597,570.690	0.000	1,350.540	551.144	0.000	0.000	0.000	0.000	0.000	599,472.374
Williamsburg	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.500
York	1,408,154.000	35,600.000	5,124.280	25,765.864	0.024	226.175	0.000	0.000	0.000	1,474,870.343
Total 2003	18,958,206.838	3,556,371.245	157,026.905	157,215.506	5,222.858	7,706.305	467.190	1,312.092	0.000	22,843,528.939
Total 2002	11,415,080.840	2,464,807.020	169,098.200	155,341.260	10,988.740	9,451.500	863.240	2,084.560	0.000	14,227,715.360
Total 2001	9,796,267.270	1,622,975.630	154,975.300	168,698.780	10,707.640	9,039.340	109.500	701.290	0.000	11,763,474.750

Table 1

2003 Groundwater Use by County (in million gallons)

County	Hydro-electric	Thermo-electric	Water Supply	Industrial	Irrigation	Golf Course	Mining	Aqua-culture	Other	Total
Abbeville	0.000	0.000	2.919	0.000	0.000	0.000	0.000	0.000	0.000	2.919
Aiken	0.000	0.000	4,564.925	1,663.958	112.559	18.555	75.460	0.000	0.000	6,435.457
Allendale	0.000	0.000	415.420	798.210	508.830	0.000	0.000	0.000	0.000	1,722.460
Anderson	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bamberg	0.000	0.000	527.601	0.000	341.930	0.000	0.000	0.000	0.000	869.531
Barnwell	0.000	0.000	686.014	0.000	89.090	0.000	0.000	0.000	0.000	775.104
Beaufort	0.000	0.000	4,352.805	145.595	601.521	825.898	0.000	7.472	25.100	5,958.391
Berkeley	0.935	8.506	236.862	1,087.236	0.240	9.000	0.960	2.817	0.000	1,346.556
Calhoun	0.000	0.000	236.645	167.500	46.490	21.800	0.000	0.000	0.000	472.435
Charleston	0.000	0.000	3,639.136	78.510	5.466	709.869	0.000	0.000	0.000	4,432.981
Cherokee	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chester	0.000	0.000	0.000	1.497	0.000	11.010	0.000	0.000	0.000	12.507
Chesterfield	0.000	0.000	474.466	0.000	57.644	0.000	0.000	0.000	0.000	532.110
Clarendon	0.000	0.000	627.690	0.000	119.837	14.450	0.000	0.000	0.000	761.977
Colleton	0.000	2.203	768.594	0.000	1,264.900	50.910	0.000	0.000	0.000	2,086.607
Darlington	0.000	432.837	2,267.157	1,314.583	0.000	0.000	0.000	0.000	0.000	4,014.577
Dillon	0.000	0.000	1,647.039	0.000	3.000	0.000	0.000	26.800	0.000	1,676.839
Dorchester	0.000	0.000	585.327	802.100	0.000	65.000	0.000	0.000	0.000	1,452.427
Edgefield	0.000	0.000	0.000	0.000	23.000	22.050	0.000	0.000	0.000	45.050
Fairfield	0.000	0.000	58.102	0.000	0.000	0.000	0.000	0.000	0.000	58.102
Florence	0.000	0.000	4,779.121	656.176	53.120	126.300	0.000	0.000	0.000	5,614.717
Georgetown	0.000	0.000	1,066.668	25.942	0.000	10.100	0.000	0.000	0.000	1,102.710
Greenville	0.000	0.000	28.682	68.176	0.000	6.157	0.000	0.000	0.000	103.015
Greenwood	0.000	0.000	19.230	0.000	1.200	0.000	0.000	0.000	0.000	20.430
Hampton	0.000	0.000	507.321	376.400	856.215	14.080	0.000	85.300	0.000	1,839.316
Horry	0.000	0.000	636.003	87.834	105.946	432.954	0.000	0.000	33.933	1,296.670
Jasper	0.000	0.000	563.386	0.000	207.208	0.000	0.000	4.000	0.000	774.594
Kershaw	0.000	0.000	772.193	345.542	0.000	29.624	0.000	0.000	0.000	1,147.359
Lancaster	0.000	0.000	0.000	0.000	0.000	1.218	0.000	0.000	0.000	1.218
Laurens	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lee	0.000	0.000	577.888	0.000	15.319	0.000	0.000	0.000	0.000	593.207
Lexington	0.000	0.000	373.169	334.348	891.404	15.110	721.000	0.000	0.000	2,335.031
Marion	0.000	0.000	1,388.508	0.000	4.150	36.638	0.000	0.000	0.000	1,429.296
Marlboro	0.000	0.000	877.293	231.014	125.810	0.000	0.000	0.000	0.000	1,234.117
McCormick	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Newberry	0.000	0.000	47.365	0.000	48.208	0.000	0.000	0.000	0.000	95.573
Oconee	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Orangeburg	0.000	1,660.084	585.140	773.536	1,044.582	11.339	1,761.340	0.000	0.000	5,836.021
Pickens	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Richland	0.000	0.000	396.463	647.863	0.982	97.262	1,716.060	13.500	0.000	2,872.130
Saluda	0.000	0.000	105.535	0.000	0.000	0.000	0.000	0.000	0.000	105.535
Spartanburg	0.000	0.000	26.382	13.270	0.000	0.785	0.000	0.000	0.000	40.437
Sumter	0.000	0.000	5,858.533	418.332	421.347	101.849	0.000	0.000	0.000	6,800.061
Union	0.000	0.000	0.000	2.137	0.000	0.000	0.000	0.000	0.000	2.137
Williamsburg	0.000	0.000	356.982	1,075.700	0.000	0.000	0.000	0.000	0.000	1,432.682
York	0.000	0.000	4.800	3.794	0.000	35.210	193.060	0.000	0.000	236.864
Total 2003	0.935	2,103.630	40,061.364	11,119.253	6,949.998	2,667.168	4,467.880	139.889	59.033	67,569.150
Total 2002	0.600	2,235.300	43,304.590	11,710.080	18,679.650	4,571.420	2,296.640	199.390	106.220	83,103.890
Total 2001	0.640	2,009.250	38,549.990	11,881.120	16,413.500	4,263.200	2,582.250	163.880	204.840	76,068.670

Table 2